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CP/M COMMENTS

by William J. Leary Jr.
280 Ash Street, Hopkinton, Mass 01748

Re: CP/M FILE EXTENTS
by Edward W. King in MUG #47.

The safest way to access multiple extent files under CP/M is to use the method hinted at in the CP/M documents. What most of us do when we create a FCB (file control block) is zero most of the block except the file name and type. What this does, among other things, is zero the EX (extent) number in the FCB. Thus, when we open the file we implicitly open the zero, or first, extent. The CP/M documents mention using non-zero extent numbers when opening files. If you were to open all the extents of a file, using a fresh FCB with a different extent number, for each one, you could then access all of the file without doing any directory accesses at all. There are, however, four drawbacks to this approach.

- 1) It's going to use 32 bytes per 16K of the file;
- 2) If you've written to the file, you have to close all the extents you wrote to;
- 3) The code to access the file is going to be complicated by having to check which extent to access each time it reads/writes the file; and,
- 4) If you are running under MP/M you have to close all the extents no matter what you've done to the file.

Re: CP/M and CBIOS Kludges

I've noticed several articles lately showing how to hook new code into your CBIOS. The problem, it seems, is that nobody that sells CP/M for Micropolis bothers to give us the source code for the CBIOS so we can make these changes properly. I had these problems when I modified my disk controller to shut off the drive motors under CP/M 1.4 and when I wanted to add interrupt code under 2.2. I finally got so fed up with the thing that I wrote my own CBIOS using the CP/M and Micropolis documents. I also re-wrote the boot routine that goes on the disk and wrote a program to install the whole shooting match into ram and the disk. I've also got a minimal formatter that works with this thing. I'm going to release the whole thing into the MUG library Real-Soon-Now. The delay is because I don't intend to support this thing (I'm too busy making a living) and want it to stand on it's own.

Re: The other side of MOD IV.
Cylinders vs. Out and Back.

Cylinders: This is when each track is taken to have X number of sectors, some of them on one side of the disk (surface in computer lingo) and some on the other. On really big disks (ie: multi-platter jobs) we've got lots of these surfaces. The

advantage of this is access time. One step of the head gives you twice (or more) as many sectors.

Out and Back: This is when each track is considered to occupy only one side of the disk. Typically we pretend the disk has actually got twice as many tracks as it's really got, then just divide the track number by 2 to decide which side of the disk we are accessing. You (usually) have the first track of side 0 and the first track of side 1 occupy the same track position, thus, it's really more of an Out and Out approach. As an alternative, you can have the last track of side 1 reside under the first track of side 0, this gives true out and back. The advantage to the out and back approach (especially for Micropolis folks) is that it lets us read (and sometimes write) on disks that came from single sided machines. If I were setting up a double sided CBIOS I'd probably opt for the out and back approach, so I could read my old disks without any trouble.

Editor's Note: Actually, I think that, except for the directory on track 0, Micropolis does an Out and Out. The "second" side is considered an extension of the "first". That is, each track is composed of 32 sectors, 16 from each side. I think this, because a newly formatted disk, under either MOD II (single-sided), or MOD IV (double-sided), shows 76 (4Ch) tracks free, not 76 and 152. The reverse side of track 0 is seemingly not used. Furthermore, a test file generated by executing SAVE 0000 BFFF "TEST", under MDOS shows a size of 193 sectors (C1h) in either system. However, the FREE command shows 63 tracks free in MOD II, and 69 tracks free in MOD IV. The mathematics works out to say that MOD II allocates a track at a time, each being 16 sectors, or 4K. The MOD IV allocates a track at a time, each being 32 sectors, or 8K.

(For those who are interested: For MOD II, 193 sectors divided by 16 sectors per track equals 12 tracks, remainder of one sector. Therefore allocate 13 sectors. 76 sectors minus 13 sectors equals 63 tracks free. For MOD IV, 193 sectors divided by 32 sectors per track equals 6 tracks, remainder of one sector. Therefore allocate 7 sectors. 76 sectors minus 7 sectors equals 69 tracks free.)

This doesn't stop MOD IV from reading MOD II, however. There evidently is something in the directory that tells the MOD IV system that the current disk is single-sided.

Seems very clean. Too bad this operating system didn't become much more popular.

On the other hand, Vector does it differently with their double-sided CP/M. A double-sided disk is said to have 154 tracks, each having 32 2K-sectors per track. A single-sided disk has 77 tracks, each having 32 2K-sectors.

Now, in reference to your information on CP/M file extents, I suppose that there area bunch of the readers who know what you're talking about, but I don't. Perhaps you could take those of us who don't understand this rea a bit further. For instance, I've never opened an FCB in my life. My understanding is that a FCB is the mechanism used to interface an applications program with the CP/M operating system. But I never see such an animal when I'm writing Basic programs.

This whole subject came up when Lynn complained about how long it took CP/M to print her mailing labels in ZIP order, i.e., in a random order via a pointer file.

How do I use your information to solve Lynn's problem? While you're at it, perhaps you'd consider another approach. Could one create a special, non-standard, version of their CP/M that had file extents sized at 256K, or 512K. CP/M may have to normally worry about, and allow the possibility of serving, 30 Mb drives. The specific floppy instal-

lation Lynn works with, however, never has more than the 300K on line. So, if the eight (I think it's 8) entries in an FCB referenced 32K instead of 2K ($32 \times 8 = 256$, instead of $2 \times 8 = 16$), we'd be in hog heaven. Would that work? How would one implement that? How would one transfer data from a disk formatted one way to a disk formatted the other way? Could one have one logical drive, say A:, working under a 16K extent, and others working under 256K extents?

CP/M NOTES =====

by Herbert F. Spirer
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SOME USEFUL UTILITIES

QBAX: In my salad days, I sent several large, important files to disk heaven without a backup copy. Today, if I create a new version of a file, I back it up to a "duplicate" disk (I don't use the words "backup" or "copy" since they have functional meanings). Without a special utility program, I had only two choices (1) use BACKUP, which copies the whole disk or (2) use PIP, which I instruct to selectively copy the new versions.

I don't like BACKUP because it copies the whole disk. This takes time and adds unnecessary wear to the drives.

I don't like PIP because I have to remember which files have been changed and manually enter the instructions for each backup.

QBAX (Amanuensis, Inc., RD #1, Box 236, Grindstone, PA 15442) cost about \$50 and automatically backs up only files which have been changed since the last QBAX backup. I can give the QBAX command for backup from disk x to disk y and walk away until the backup is completed since QBAX backs up only the changed files. It has several options, including selecting files which will not be backed up and terminal listing of the files which have been backed up.

When I ordered QBAX, Amanuensis said they couldn't supply it for the Vector Graphic. However, I had just found John Palmer, who converts programs to different formats (Sheephead Software, PO Box 486, Boonville, CA 95415), and Amanuensis used his services to supply me with a disk that would run on my Vector System B. (DAMAN also can make the disk format conversion from 8" to Micropolis/Vector Graphic.)

CATALOG: When I got up to 10 megabytes on floppies, I started to have as much trouble finding magnetic files as paper files. When this started to bug me, I didn't realize that there were catalog programs in the public domain and I got CATALOG (SRX Systems, 2812 Westberry Dr, San Jose, CA 95132) for about \$100. It does everything I need. After a session, I run QBAX to create the backup files, then run CATALOG for all the backed up disks to enter the files and their attributes into the CATALOG data base. (Editor's Note: DAMAN also supplies SRX's CATALOG program for \$62.51, which we have in stock. If the re-order price has gone up, it would still be less than \$100.)

When I'm searching for a file, I can search the data base for strings and quickly get to the disk and file. There are many functions available; specialized search modes, editing to identify files and disks, etc. The only complaint I have about this program is that with 20 megabytes in the data base (over 100 disks), it takes about a minute to update the data base for each revised or new disk. I can find things to do, but I wish it were faster.

"D": Gary Van Cott sent me a disk containing D.COM, a nifty directory program from the public domain (source unknown to me). (Editor's Note: D is

available on MUG CP/M library disk 1901. See the February MUG newsletter for details.) D gives an alphabetized listing of all files (both \$DIR and \$SYS types) with their size, the number of files on the disk, total space used and remaining space on the disk. I find this a convenience when I am working close to margin or looking for a particular file. Send me a disk and I'll send you this program.

INITIALIZING DISKS

You must format disks before use, unless you make a duplicate with BACKUP. I like to put the CP/M system on all disks as well; it costs nothing in storage space (the system tracks are not used for file storage). I also put on the following utilities on all disks: QBAX (after all, every disk will require backing up), CONFIG (so I can use control-P to print out files or directory), D (to get more informative directories), and PIP (who knows when I want to transfer a file?). Since the four utilities appear on all disks, I don't want them appearing in the DIR directory listing, which can be avoided by giving them the status of system files, using STAT.

To make initialization of disks less of a chore, I use SUBMIT. I created the text file STARTUP.SUB using SCOPE:

(Editor's Note: SCOPE is a Vector text editor supplied in lieu of the Digital Research ED. Readers may use any other text editor or word processor to create the file, as long as you save it in ASCII form.)

```
FORMAT
MOVCPM
SYSGEN
PIP B:=A:PIP.COM[V]
PIP B:=A:QBAX.COM[V]
PIP B:=A:CONFIG.COM[V]
PIP B:=A:D.COM[V]
STAT B:.* $SYS
CONFIG
```

STARTUP, SUBMIT, QBAX, PIP, CONFIG, D, MOVCPM, and SYSGEN are all on my CP/M system disk. I invoke this procedure with SUBMIT STARTUP. This routine does mean that I have to insert some carriage return, B: now and then, and to answer CONFIG queries, but this is easy to do while working on other tasks in the office, and I know that every new disk has the same complete set of starting files.

If you try this, be sure to use the double \$ sign (\$\$) in line 8 of STARTUP. Since \$x is used by SUBMIT for passed parameters, it will give you a "Parameter Error in Line 8" error message if you use a single \$.

I had a lot of trouble getting the STAT command to work in the SUBMIT file. The command which manually sets the files to system status is:

```
STAT B:.* $SYS
```

When I put this line into STARTUP.SUB, I got "parameter error on line 8." This was puzzling. How could a command which works manually not work in a SUBMIT file?

The answer is that the "\$" character is the prefix for parameter identifiers for passing parameters in the execution of SUBMIT. For example, if you want to specify a different file each time you run SUBMIT with a given SUB file, you put this line your SUB file:

```
PIP B:=A:$1.$2[V]
```

The \$1 and \$2 identify the first and second passed parameters, respectively. If the file you wanted to move was USERCUST.ASH, then the command would be:

```
SUBMIT STARTUP USERCUST ASH
```

and SUBMIT will execute:

PIP B:=A:USERCUST.ASM[V]

Great! But this means that you cannot have a leading \$ on any entry in a SUB file.

To get around this limitation and still use SUBMIT to put the transferred files into the directory, I added this line to STARTUP.SUB:

STAT B:*. * \$1

and use the following line to execute the program:

SUBMIT STARTUP \$SYS.

It works.

Finally I figured out you can use the \$\$SYS, which is even cleaner.

Editor's Note: Herb, why do you have the MOVCPM command in the SUBMIT file? My SYSGEN will read the system tracks off A: and put them on B:. Is there a different effect accomplished by your method?

I guess I can understand why you'd want CONFIG on your disk, if you have multiple printers, etc., but why do you execute it during your initialization? Your have already copied - or created, since you don't like the word copy - a configuration onto your new disk.

For those readers who haven't seen it before, the [V]s in Herb's file cause the system to verify the writing on the new disk. MDOS always does this, some CP/Ms have to ability to always do this. I don't know how you tell if your CP/M automatically verifies, nor do I know if the use of [V] in these automatic verification systems causes an unnecessary increase in transfer time. If you don't know, then the [V] is surely good practice. The POWER utility program, by the way, always automatically verifies transfers.

.....

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*****
*
*      MDOS SPECIAL INTEREST GROUP
*
*****
```

REVIEW OF BEM
=====

by Mrs. Buzz

The response to last month's sale of BASIC/2 for MDOS was so good I thought I would try to expand your knowledge of other programs that run under MDOS. This month's review is BEM - also written by Bob Zale. If you haven't taken advantage of purchasing BASIC/2 for \$85, or really didn't need all the extras that are in BASIC/2, then BEM is probably just what you're looking for. To me, writing a program with BEM is like using SPELL-BINDER for wordprocessing (piece-of-cake), and cheap, too.

BEM provides a EDIT function for writing your BASIC programs. A global SEARCH, including "wild card" substitution, locates every occurrence of a specified character group. Global CHANGE (with conditional replacement), allows easy variable renaming, file renumbering, etc. This function is really nice when you have a program that has the year hard coded and you need to change it but can't remember where it is and don't want to take the time to dump a hard copy.

The local EDIT function provides list, search, delete, change, insert, kill, zap, append, and replace with automatic repetition, if desired. You may even change a line number, with optional retention of the original line. MOVE will relocate

a block of program lines, adjusting all line number references, as needed.

LISTF will provide a useful program listing. Noted in your listing are the entry points of each GOTO, END, and ERROR statement, as well as the entry and exit of each GOSUB and ENDPAGE. FOR loops are identified with multilevel indentation, if nested. A sorted list of variables and functions is provided, as well as an error report of references to non-existent lines. Finally, memory allocation is computed for each variable type, as well as program and system software size.

In the BATCH mode, up to 12 programs may be listed with a single command. I like this feature too - there's nothing worse than sitting and watching a printer run. I much prefer to start it up and go have a cup of coffee. In the REPEAT mode, BEM will generate up to 255 copies automatically. I have never had the need for 255 copies, but it might be interesting to see if it really worked. However, knowing Bob Zale, I'm sure it would.

LISTREM command supplies a outline of your program, through formatted documentation of remark lines.

How many of us have had to type in our own line numbers and forget to type in the number? Or type in a number that already existed - now you don't know what was on that other number and have to start all over. Well BEM has taken care of that little fault of ours. The AUTO command provides automatic line number generation, with optional increment and starting line number.

As program titling is automatic, SAVE and RESAVE may be executed with or without specification of a file name. Also included is a number base conversion package, a RENUM that does it all, MERGE, LISTVariables, HELP, and more.

All reports and program listings may be directed to the line printer, with correct pagination and formatting for easy review. A PAGESIZE command allows control of printer output, directly from the console. In addition to automatic titling, reports may include an optional HEADER line to document date and time, or any other needed information. Three PRINTER commands are included, to allow immediate output of user-definable control codes.

A interruptable speed control allows flexibility in reviewing program listings, or other reports, on any terminal. All output may be displayed at any of nine user selectable speeds. The output speed may be altered at will, from the console, without halting execution. This allows a quick scan to a needed section, and subsequent 'slow-stepped' output, to allow for careful review.

BEM list for \$65 but you can catch our sale and get it for \$47.97.

.....
(End - MDOS SIG)

```
*****
*
*      BASIC/2 SPECIAL INTEREST GROUP
*
*****
```

BASIC/2 CORNER #19
=====

by Steven Guralnick
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Daly City, CA 94015

I got a call the other day from a customer of mine who is using the tickler package. Seems she had to have the database sorted from time to time. I decided to write it stand alone because I wanted to clear Tickler out of memory, to provide the maximum sort space. Also, not knowing how much memory might be available on someone else's equipment (nor

how many records were to be sorted at one time), I decided to set up the sort in as dynamic a way as possible, so as to work in most systems.

The field being sorted here is DESCRIPTION\$. The maximum length of that string is seventy. Here's what I came up with:

```

200 ON ERROR GOTO @GLOBAL.ERROR

300 REM*****
400 DIM DESCRIPTION$(70),COMMENT$(70),SORTED.DESCR
    IPTION$(70)
500 POKE(SETUP+375)=32:REM SET UP SPACES FOR EDIT$
600 UPGAGE
800 STRING"\":STRG$="":CRLF$=CHR$(13)+CHR$(10)
900 CONSOLE
1000 GOSUB @OPEN.FILES:REM OPEN THE OLD TICK.DAT
1005 GOSUB @CONTINUE:IF SIZE(1)=0 THEN 1005:REM
    ,
    DON'T TRY TO SORT IF NOTHING'S THERE
1100 GOSUB @CALCULATE.LENGTH:REM GO FIGURE OUT HOW
    MUCH OF DESCRIPTION$ CAN BE USED FOR THE SORT
1300 DDIM L$(SIZE(1)-1,LENGTH.ALLOWABLE+4):REM NOW
    SET UP THE DDIM, ADDING 4 FOR THE RECORD
    NUMBER
1500 IF SPACELEFT<3000 THEN PRINT "You are getting
    very low on memory":PRINT SPACELEFT;"bytes are
    left. Press <cr> to continue.
    ";:CONTINUE$=EDIT$(0):IF ALTKEY=1 THEN STOP
1600 CLS
1605 PRINT TAB(1,10);"Description will be sorted on
    the first";LENGTH.ALLOWABLE;"characters."
1700 PRINT TAB(12,31);"READING TO RECORD";SIZE(1)
1800 FOR I#=1 TO SIZE(1)
1900 PRINT TAB(13,40);I#
2000 REM NOW GET AN OLD RECORD
2100 GET 1 RECORD I# PREVIOUS.DATE$,NEXT.DATE$
    ,STATUS$,DESCRIPTION$,COMMENT$
2200 GOSUB @STOP.SORT
2300 REM NOW SUBSCRIPT THE CONCATENATION OF
    DESCRIPTION$ AND THE CASE RECORD NUMBER
2400 SORTED.DESRIPTION$=DESCRIPTION$+REPEAT$(
    ",LENGTH.ALLOWABLE)
    :SORTED.DESRIPTION$=LEFT$(SORTED.DESRIPTION$,
    LENGTH.ALLOWABLE):REM JUST PICK OFF ON THE
    LEFT$ WHAT YOU'VE DECIDED WILL FIT IN MEMORY
2500 L$(I#-1)=SORTED.DESRIPTION$+FMT(I#,"9999"):RE
    M: ADD THE RECORD NUMBER
2600 NEXT I#
2700 REM NOW SORT IT
2800 SORT L$(0),L$(SIZE(1)-1),"AU",LENGTH.ALLOWABLE
    +4
2900 REM NOW CREATE A TEMP FILE
3000 CREATE 2 "TEMPFILE.DAT" RECLEN 160 ERROR
    3100:GOTO 3200
3100 SCRATCH "TEMPFILE.DAT":GOTO 3000
3200 ON ERROR 2 CLEAR
3300 REM NOW GO PUT THE NEW DATA TO DISK, IN SORTED
    ORDER
3400 CLS
3500 PRINT TAB(11,27);"SETTING UP SORTED FILE"
3600 FOR I#=0 TO SIZE(1)-1
3700 OLD.RECNO#=VAL(RIGHT$(L$(I#),4))
3800 GET 1 RECORD OLD.RECNO#
    PREVIOUS.DATE$,NEXT.DATE$,STATUS$,DESCRIPTION$,
    COMMENT$
3900 GOSUB @STOP.SORT
4000 PUT 2 RECORD I#+1 PREVIOUS.DATE$+STRG$;NEXT.D
    ATE$+STRG$;STATUS$+STRG$;DES
    CRIPTION$+STRG$;COMMENT$+STRG$+CRLF$
4100 GOSUB @STOP.SORT
4200 PRINT TAB(13,28);"WRITING TO RECORD";SIZE(1)
4300 PRINT TAB(14,1);I#+1;" ";L$(I#)
4400 NEXT I#
4500 REM ALL DONE
4600 CLOSE
4700 SCRATCH "TICK.DAT":RENAME("TEMPFILE.DAT")="TIC
    K.DAT"
4800 PRINT TAB(17,05); "Sort is completed."
4805 PRINT TAB(18,05); "Press <cr> to go to Tickler
    Program (ESCAPE to exit)":CONTINUE$=
    EDIT$(0):IF ALTKEY=1 THEN STOP
4900 LINK "TICKLER.COM"

5000 LABEL @CONTINUE:REM*****
5100 CLS
5200 PRINT "This program allows you to alphabetize
    your tickler data file."

```

```

5300 PRINT"The old file will be completely
    restructured, alphabetically."
5400 PRINT "You may halt the sort (and the writing
    of the new file) by"
5500 PRINT"pressing the ESCAPE key at any time
    prior to the program's completion."
5600 PRINT
5700 CONTINUE$="":PRINT"Proceed? (YES/N) (<cr> or
    ESCAPE exits) ";:CONTINUE$=EDIT$(3):PRINT
    "":IF ALTKEY=1 THEN CLOSE:STOP
5800 IF CONTINUE$<" " THEN IF CONTINUE$<"YES" THEN
    GOTO @CONTINUE
5805 IF CONTINUE$=" " THEN CLOSE:STOP
5900 RETURN

6000 LABEL @OPEN.FILES:REM*****
6100 REM: THIS ROUTINE OPENS THE FILE
6200 OPEN 1 "TICK.DAT" RECLEN 160
6300 RETURN

6400 LABEL @GLOBAL.ERROR:REM*****
6500 BELL(3)
6600 CLS
6700 PRINT "Global error has taken place as
    follows:"
6800 IF ERRLINE>0 THEN PRINT "Error line
    is";ERRLINE
6900 PRINT "Error is ";ERR$
7000 PRINT "Error number is";ERR
7100 PRINT:PRINT "Please write this down. Then
    press <cr> to shut down.":CONTINUE$=EDIT$(0)
7200 CLOSE
7300 STOP

7400 LABEL @STOP.SORT:REM*****
7500 REM THIS ROUTINE ABORTS THE SORT
7600 IF INSTAT=0 THEN RETURN
7700 IF INCHAR$<>CHR$(27) THEN RETURN
7800 FOR SCREEN&=21 TO 23:PRINT
    TAB(SCREEN&,1);SPC$(70):NEXT SCREEN&
7900 BELL(2):CONTINUE$="":PRINT TAB(21,5);"Sort is
    halted. Press <cr> to continue or ESCAPE to
    exit.":CONTINUE$=EDIT$(0):PRINT " "
8000 IF ALTKEY=1 THEN CLOSE:PRINT
    TAB(21,1);SPC$(70);TAB(21,5);"Sort terminated.
    Exiting to system.":CLOSE:STOP
8100 FOR SCREEN&=21 TO 23:PRINT
    TAB(SCREEN&,1);SPC$(70):NEXT SCREEN&
8200 RETURN

8300 LABEL @CALCULATE.LENGTH:REM*****
8400 REM THIS ROUTINE FIGURES OUT HOW MUCH OF
    DESCRIPTION$ WILL FIT INTO
8500 REM MEMORY FOR THE SORT. MAX IS 70
    CHARACTERS+4 FOR THE RECORD NUMBER
8600 SPACE.AVAILABLE=SPACELEFT*.85:REM TAKE OUT
    SOME FOR OVERHEAD
8700 LENGTH.ALLOWABLE=INT(SPACE.AVAILABLE/SIZE(1))
8710 DECR LENGTH.ALLOWABLE,4:REM SAVE 4 BYTES FOR
    THE RECORD NUMBER
8720 IF LENGTH.ALLOWABLE>70 THEN
    LENGTH.ALLOWABLE=70:REM THIS IS MAX
8730 RETURN

```

The program works well. It's slow when it's re-writing the temp file because it shows the entire length of the sorted DESCRIPTION\$ on the screen. It's at line 4300. You can add an option which turns on that feature or turns it off.

Anyway, I wanted you to see this because it can be used for any kind of sort, especially where you're not sure how much will fit.

No letters have arrived; got one phone call. As long as I have something I can share with you, I will keep this column going. Otherwise, if I run out of stuff and you keep on not writing, this will go the way of the proverbial dodo bird.

See you soon!

.....
End - Basic/z SIG)

 * VECTOR GRAPHIC SIG *
 *

VECTOR NON-COMPATIBILITY

by Dr. George E. Smith
 3211 Zion Drive, El Paso TX 79904

It all started when I got a phone call from a friend with a sick Im sai. He wondered if I would help by substituting some of my Vector Graphic boards in his S-100 machine until we found his bad board. How could I refuse such a simple request. After all, we both had S-100 machines and the boards were interchangeable, weren't they? I put on my shiny armor and went charging off to his house in my white rabbit only to run right into the facts of life. Nothing worked!

First we put his 8080 CPU board in the Vector in place of my Z-80 board. The system was totally dead -- not even a monitor prompt. Obviously then, the bad board was his CPU. So, just for fun, we put the Vector Z-80 card in the IM SAI. Still nothing. I knew the Vector board was good, so we started making all kinds of swaps. It soon became apparent that both the 48K memory board AND the Z-80 board AND the PROM-RAM board were required to be in the system at the same time. My friend's comment: "What you have here is not a memory board, it's a CPU support board."

Since that time, I have learned a few things about the Vector and why we couldn't get things to work that day. So when Buzz asked me to write about Vector's version of the S-100 bus, I again dug out my (no longer shiny) armor and got out the trusty white terminal. Apparently more than a few people have had similar experiences, judging by comments in the MUG newsletter, so perhaps I can shed a little light on the subject.

Let's begin with a comparison of Vector's version of the S-100 bus and then get on to the reason that my boards didn't work in my friend's machine. I own a 1979 M2-B so some things may not apply to newer machines. On the other hand, almost all of Vector's S-100 products were designed before the IEEE-696 standard was published and there is no reason that there has to be more than one version of Vector's bus. All of the information I have here has been taken from a combination of Vector's hardware manuals that came with my machine and practical experience.

The good news is that VG's motherboard and enclosure are as standard as you could want. I have plugged a considerable variety of boards into mine with no problems at 6 & 8 megahertz. The motherboard sports passive termination which Vector boasted "works even when the machine is turned off." Most of the changes made by the IEEE-696 standard involved lines originally used by the Altair of Im sai front panels. Vector has never (to my knowledge) supported a front panel in their systems and so this is not a problem. If you want to (shudder) throw out all your VG cards and build a new system with new cards, you can expect it to work fine. Unfortunately the extended address (A16-A23) lines are NOT terminated since they were unused in the original S-100 bus. I don't have enough memory yet to test those particular lines but if you are building a super micro in your VG box, you might be concerned about terminating those lines. (Editor's note: Huh?)

All right, the motherboard is standard enough, but why wouldn't the various cards work independently? The answer lies in Vector's use of lines 55 and 75 as shown in figure 1., and the fact that the 48K (and other) dynamic RAM board depends on the Z-80 to provide memory refresh at least every 2 msec. .

line	Vector	Altair	IEEE-696
55	Fast-RESET	RTC	TMA-0
75	PRESET*	PRESET*	PRESET*

Figure 1

To get a better understanding of what this means, let's follow the M2-B reset sequence step by step.

When your finger presses the RESET button on the front of the enclosure, you are shorting line 75 to ground for as long as you hold in the button. If you are fast, that may be a tenth of a second, which is 100 msec or 50 times as long as the memory board can tolerate. Yet we all know that nothing happens to memory contents when we push the magic button.

What does happen is that first of all the CPU's RESET line is not connected to pin 75 like all those ordinary CPU boards are and second, the dynamic memory board IS connected to pin 75. When you drop the voltage on line 75 from +5V to 0 by pushing the reset button, the memory board produces a 200 microsecond pulse on line 55 and that happens to be the line that the CPU is monitoring. The CPU stops refreshing memory during that very short reset pulse instead of the "long" time that you push the button. Thus the memory board has successfully protected itself from disaster.

But the PROM-RAM board has a role to play too. When it detects both a RESET condition and a request for data at address 0000h, it exerts the line called PHANTOM* and provides the first instruction in the PROM for the CPU. Naturally, the first instruction is for the CPU to jump to the normal address of the monitor routine. Incidentally, this is a common method for making a ROM card work, and it is conceivable that you could substitute other ROM cards, though I haven't done that yet.

So much for what happens in a few milliseconds in a normal system. What can we do to change anything? In my opinion, most changes are probably more trouble than they are worth. I have added a Morrow Mult-I/O board, 8K of static RAM and a USR MODEM to my Vector all without any nasty surprises.

The only involved change was when I went from a 48K to a 56K configuration by feeling my way along one step at a time. The first step was to reassemble the source code for the VG monitor program for E000h and burn a new ROM for that address. Then the Flashwriter, Disk Controller, and PROM-RAM were all re-addressed for the top 8K of memory. Everything was plugged in, and presto! I had converted from a 48K system to a 56K system.

Editor's Note: I assume that you knew that there's a 48K to 56K conversion kit from Vector that includes the new ROM, and 8K board, and CP/M 2.2. The cost is rather high. So the questions that arise are:

1) Did you use a Vector memory board? If not, or in any case, what do you have to do to get non-Vector memory to run in a Vector? How does the answer to the preceding question differ for dynamic and static memories?

2) I know you'd need another 4K board, and I know that the monitor, the system RAM, and the Video Memory take up 5K, but could you make a 59K system?

3) How do you "burn" a ROM? How did you figure out what code to change, and how to change it?

(End - Vector Graphic SIG)

QUESTIONS THAT NEED READERS' ASSISTANCE

MEMORITE

Vector Graphic Mysteries I: If you have MEMORITE up and running, try the CX command. It does something, but what? Can anyone tell me what it does?

CONNECT

19,200 (or other) Baud communications: I have a version of PLINK modified by Jack Boardman which works with the System B. One of its useful features is that I can have 300, 1200 or 19,200 baud communications by a simple step. I load his version of PLINK and when fully loaded, hit RESET. I then use PO156 in the monitor to change the byte at 0156H which sets the baud rate. Set it to CF to get 300 baud, the default; CE for 1200 baud and CD for 19,200. Press ESC to get back to the monitor and GOTO 0100 brings back the executing program, in operation at the desired baud rate. Can anyone tell me how to get the same results with CONNECT? I don't know enough to do this myself.

Herbert F. Spier, The University of Connecticut
71 Big Oak Road, Stamford, CT 06903

DISK EMULATORS

Buzz: Has anyone in the user's group added an S-100 SemiDisk Disk Emulator to a System B?

Jack Byrne, Ala Moana Psychological Associates, Ala Moana Pacific Center, 1585 Kapiolani Blvd., Suite 1206, Honolulu, Hawaii 96814.

Jack- I haven't done so, but you might try writing Louis Wheeler, 1323 Tamera Dr., Oceano CA 93445. Louis had an series of articles in Jan. & Feb. 84 BYTE that showed how to install bubble memory as a disk emulator, running under both MDOS & CP/M. If anyone else has some knowledge, please share it.

Buzz: Enough! I've put this letter off too long already. I have a whole list of questions.

CBIOS

It has begun to dawn on me that some of the Vector users have copies of the BIOS. I don't (aarrghh!). I figured for a while that Vector just didn't give it out.

VECTOR 3 CONTROLLER

Next. The Vector 3 disk controller board (also no documentation -- help!) doesn't use a standard disk controller chip. It's all standard 8-16 pin logic chips. This has to do with the next question. Is anyone out there working to get the Dyan Digital Diagnostic Diskette working on a Vector 3? Does Dyan even make one for us? I'd be interested in working on it if no one else is but I'll need some help with the disk controller data.

VECTOR MAIL LIST PROGRAM

Did you know that there's a bug in the mailing list SORT program. If you have 257 records it seems to take time to sort all the keys and then dumps the first record only into the new file. I suppose it is ignoring the high byte on the output count (257D = 0101H). Has anyone tried to work out a fix or shall I try? How these little jobs do pile up . .

BURNING PROMS & VERTICAL BARS

Can anyone out there burn a 2708 Eprom from a Vector disk source? At what cost? I'm getting tired of doing without the vertical bar in CP/M. I want to add it to the code conversion table in the

Monitor. (How ya' gonna pipe without a vertical bar?)

MEMORITE

Does anyone know what the Memorite III modem transfer protocol is? In case you've forgotten, it's the 'cm' command at auxiliary command level (Copy Memorite to Memorite). It's not the same as Modem 7. I tried that. If no one knows, how do we find out?

Has anyone worked up a Memorite Console Interface? I have a kernel, MEMPLUS, running but haven't expanded it much yet. I'm not sure about copyright problems so I'm being cautious. The Memorite source on disk remains untouched. My guess is that we can't share a patched Memorite but we can share a Memorite in-memory patcher. As it is, MEMPLUS loads Memorite and initializes it with control-P (flip pages-don't scroll) and I have one special console command: control-Q (quick search, a one stroke search from cursor position). Adding more pre-defined macros is easy, but I want to add run-time defined macros and teach it to distinguish between edit level and auxiliary level. Does anyone have a wish list? What have you always wished Memorite could do more easily? (Can you believe all those keystrokes to search to a word a few lines down? Memorite II was much nicer for that!)

SIG/M SOFTWARE

More...! Buzz, what's the latest SIG/M volume you have and what's the cost per volume with and without a program submission?

David Vergin, Box 458, Elma, WA 98541

Dave- The answers to most of your questions will have to wait my research, or the response of some already knowledgeable member. However, I can quickly answer a few.

I don't think Vector ever "gave out" the BIOS to their CP/M. Some people are disassembling it. They did give out the USERAREA.ASM files for the printer drivers. I could get you copies of mine, but I'm not sure they'd work for you. My system is a System B, not a 3. I assume that the 3 uses Tandon double sided drives and a non-Micropolis controller? You could add to my knowledge if you'd explain just what boards are in a System 3.

The Micropolis alignment disks will work just as well on a Tandon. Lynn has single or double sided, 96 or 100 TPI versions.

The problem is now how to position the head to read the tracks, and where to measure the results. Vector must have a diagnostic program similar to Micropolis', and must have a maintenance manual for the drives, but I don't have either of them. Micropolis' diagnostic program is written in MDOS, of course. You might contact David Bates of Proto-PC (2439 Franklin Ave, St. Paul MN 55114, 612/644-4660). They sell an alignment package and they order Micropolis parts from Lynn. That doesn't mean there's any connection, but maybe.

As for your vertical bar, you can use a program named Smart Key to define new characters. It works for the vertical bar on the Vector, if the applications program goes through CP/M to get keyboard input. My Spellbinder wordprocessor goes directly to the keyboard port. I would imagine most of the software Vector markets also goes directly to the keyboard. It works great under Basic, and under the CP/M monitor.

I can get any SIG/M volume. There's a fellow in town who gets all the latest releases in 8". I can download. Cost is the same; \$10 without a program and disk, \$3 with a library submission.

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The following software will be supported by DAMAN, and is up-to-date product. We simply want to reduce our inventory. Prices hold only for amounts in inventory.

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Price 1 of the two DAMAN prices listed above is for orders which are pre-paid by check or money order, or are COD (There is an additional \$2 COD charge). Price 2 is for accounts and charge card purchases. Both prices include ground UPS shipping.

 *
 * EXTRA SPECIAL STAR RADIX PRINTER SALE *
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NOTE: THIS MONTH'S NEWSLETTER WAS
 PRINTED BY THE RADIX

DAMAN is getting a price break, for a limited time, on the RADIX model printer. Until October 1, you may purchase the RADIX 15 printer for \$762 (price 1) or \$785 (price 2), or the RADIX 10 for \$668 or \$695. All guarantees are the same as stated above.

These are class 200 cps printers with 50 cps near-letter-quality modes. Really looks good. Included in the RADIX features are automatic single sheet insertion, 240 x 144 ultra-hi-resolution bit-image graphics, and a short form tear-off (useful for invoices, etc.). Handles single sheet, rollpaper, or sprocket-fed continuous-form paper.

